Amendments to the Drawings:

The attached drawing page includes the following:

Replacement Sheet for Fig. 2.

Remarks:

Applicant has carefully studied the non-final Examiner's Action mailed 11/17/2005, having a shortened statutory period for response set to expire 02/17/2006, and all references cited therein. The amendment appearing above and these explanatory remarks are believed to be fully responsive to the Action. Accordingly, this important patent application is now believed to be in condition for allowance.

Applicant responds to the outstanding Action by centered headings that correspond to the centered headings employed by the Office, to ensure full response on the merits to each finding of the Office.

Elections/Restrictions

Applicant thanks the Office for acknowledging the election of group 1, claims 1-5.

Applicant acknowledges the withdrawal from further consideration of claims 6-13. Claims 6-13 are therefore canceled herewith. Applicant may elect to file said claims in a divisional application.

Drawings

The drawings stand objected to because Figure 2 located in the file does not match the written description. The Office's intention to attach to the outstanding Office Action the Figure 2 that is currently in the file of the Office did not result in attachment of said Figure so Applicant does not know what Figure 2 is located in the Office's file. A replacement sheet having the correct Figure 2 as said Figure appears in US 2004/0105468 is attached to page 4 of this Amendment A.

Claim Rejections – 35 U.S.C. § 102

Applicant acknowledges the quotation of 35 U.S.C. § 102(e).

Claims 1-5 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Kleinschmidt et al. (hereinafter "Kleinschmidt"). Reconsideration and withdrawal of this ground of rejection is requested for the reasons that follow.

Kleinschmidt includes no teaching or suggestion that a gas cell could be placed inside a tunable laser cavity for any reason. In Figs. 1a and 1b of Kleinschmidt, item 1 is a laser chamber, not a gas cell. As recited at col. 7, lines 1-2:

> On one end of the laser chamber 1, a light beam from the chamber 1 impinges on a first beam splitter 9a...

As further recited at col. 7, lines 66-67 and col. 8, lines 1-2:

> The beam splitter 9a reflects some of the beam and most of the rest of the beam continues unreflected along the optical path. The unreflected portion impinges a second beam splitter 9b...

At col. 8, lines 1-3, Kleinschmidt further discloses:

> At the other end of the chamber 1, a beam emerges from the chamber 1 and impinges a polarizer 13 and later impinges a resonator mirror 10.

Mirror 10 reflects most of the beam, as disclosed at col. 8, lines 17-18. As disclosed at col. 8, lines 23-24:

> The unreflected portion continues until it impinges the wavelength calibration tool 2.

As the Office points out, a laser cavity is defined as the space between the mirrors (which may serve as beam splitters) at opposite ends of a laser cavity. Thus it is clear that the embodiments of Figs. 1a and 1b lack a gas cell that is positioned inside the laser cavity. Item 2, the wavelength calibration tool, is clearly outside the laser cavity. Item 3, which is also clearly outside the laser cavity, is a signal processing and driving source and not a gas cell. Item 4, also outside the laser cavity, is a computer that serves as a main control unit. Item 5 is a tuning block, item 6 a motor drive, item 7 a wavelength monitoring component and item 8 is a display. All of these items are outside the laser cavity and none of them is a gas cell. Therefore, in fairness to Applicant, it cannot be said that said Figs. 1a and 1b teach or suggest the placement of a gas cell in a tunable laser cavity as taught and claimed by Applicant.

Figs. 2 and 3 include no structural disclosure. Fig. 4 provides a more detailed view of the structure of wavelength calibration tool 2. Figs. 5 and 6 include no structural disclosure.

The Office therefore asserts that item 104 in Fig. 7 is a gas cell that is inside the laser cavity. However, as Kleinschmidt discloses at col. 9, lines 24-28:

> Referring to Fig. 7, a third embodiment of the present invention includes a tube or purge chamber 104 located along the beam path of the laser which is purgeable with a gaseous photo-absorbing element 21 which is preferably oxygen in this embodiment.

Significantly, Kleinschmidt does not teach or suggest that a coarse wavelength tuner may be used to position the cavity resonance wavelength between adjacent absorption lines of the gas in purgeable chamber 104. Instead, Kleinschmidt teaches at col. 9, lines 32-40:

> This purge chamber 104 is usually part of the system when it is in operation. The chamber 104 is, however, purged with an inert gas such as N_2-gas or Ar-gas, and not O_2-gas, when the system is in operation. The inert purging is performed to protect enclosed optical elements from corrosion and dust, and also, ironically, to avoid the very strong Schumann-Runge O_2-gas absorption which is so useful in performing absolute wavelength calibration. The purge chamber 104 is preferably only filled with O_2-gas when wavelength calibration is being performed.

Thus, if purge chamber 104 is considered to be inside a tunable laser cavity (see col. 10, lines 7-14), could it be said that Kleinschmidt teaches or suggests that a coarse wavelength tuner may be used to position the cavity resonance wavelength between adjacent absorption lines of the gas in purgeable chamber 104? To the contrary, Kleinschmidt expressly teaches that an inert gas is placed in purge chamber 104 when the laser is in operation and that O_2-gas is placed in said purge chamber 104 only when wavelength calibration is being performed. Kleinschmidt is silent on whether or not a coarse wavelength tuner could be employed to position the cavity resonance wavelength between adjacent absorption lines of the gas (whether oxygen or an inert gas) in the purgeable chamber.

Such silence is to be expected because Kleinschmidt makes no disclosure concerning a means for operating a laser at an absorption minimum that occurs between adjacent absorption lines. Instead, inert gas is used during laser operation to minimize absorption, but primarily to reduce chemical reactivity within the Excimer gas laser discharge and degradation of the discharge electrodes due to the presence of reactive gases such as O_2. O_2-gas is used for a short period of time during wavelength tuning and calibration because it has at least one absorption line around 193 nm (see col. 10, lines 15-19). No teaching is made about tuning the laser to operate between absorption lines.

More particularly, the Office asserts, regarding claim 3:

> Kleinschmidt discloses at Figs. 1a-b a method of tuning a laser that does not require fine tuning, comprising positioning a gas cell 2 containing gas with individual line spectra (see Fig. 2) outside a tunable laser cavity (cavity is between mirrors 9 and 10) having a resonance wavelength, positioning the cavity resonance

> wavelength, e.g. 45, between absorption lines, e.g. 44, 46 of said gas (see Fig. 6), whereby the laser operates at an absorption minimum between the lines (because at 45 the beam intensity is at the dashed gain spectrum, so there is minimum absorption), whereby the laser wavelength is locked to an absolute wavelength defined by the gas.

The Kleinschmidt device does require fine tuning. As disclosed in col. 8, lines 46-51:

> When a coincidence of the wavelength of the narrowed spectral beam with one of the optical transition lines of the element 21 occurs, as discovered by a marked voltage increase, a fine tuning across the known waveform of the line proceeds for determining more precisely the absolute position of the narrowed band.

There are additional substantive problems as well with the Office's characterization of the Kleinschmidt disclosure so that it anticipates Applicant's disclosure. Wavelength calibration module 2 cannot in fairness to Applicant be characterized as a gas cell containing gas with individual line spectra between which the laser cavity is tuned to operate. Calibration module 2 is not even used during laser operation as pointed out in the above discussion. It is used only when purge chamber 104 is emptied of inert gas and operation of the laser is shut down for calibration purposes. O_2-gas is then introduced into purge chamber 104 so that its absorption lines at 193 nm may be used for calibration purposes. Thus the laser is not operating as a laser during such calibration and gas cell 2 cannot be considered the equivalent of Applicant's gas cell. Kleinschmidt even teaches, as noted above, that O_2-gas is to be avoided during laser operation. Such teaching is diametrically opposed to Applicant's teaching and certainly would have impelled one of ordinary skill away from Applicant's invention. Applicant eschews Kleinschmidt's teaching that a laser should be operated with an inert gas in a gas cell that is disposed inside or outside of the laser cavity. Nor does Kleinschmidt teach positioning the cavity resonance wavelength between absorption lines of the insert gas. The inert gas is used "to enable stable laser operation." (col. 10, lines 18-19).

Regarding claim 3, the Office characterizes Kleinschmidt as disclosing in Figs. 1a-b a method of tuning a laser that does not require fine tuning, comprising positioning a gas cell containing gas with individual line spectra outside a tunable laser cavity having a resonance wavelength, positioning the cavity resonance wavelength between adjacent absorption lines whereby the laser operates at an absorption minimum between the lines whereby the laser

wavelength is locked to an absolute wavelength defined by the gas. This characterization is inaccurate because, as already pointed out, even if purge chamber 104 is deemed a gas cell, it is filled with an inert gas during laser operation and no teaching is provided concerning positioning the cavity resonance wavelength between adjacent absorption lines of the inert gas.

Regarding claim 4, the same problem exists with the Office's characterization of Kleinschmidt as disclosing the step of employing coarse wavelength tuning means to position the cavity resonance wavelength between the lines. Kleinschmidt requires both coarse and fine tuning as already noted and never mentions any need to position the cavity resonance wavelength between any absorption lines.

Regarding claim 5, the problem persists with the Office's characterization of Kleinschmidt as disclosing the step of using an external tuning means to tune the laser within a few nanometers of the minimum absorption length so that it lases at the minimum spectral absorption lines where the cavity has maximum gain.

Regarding claims 1-2, there is also a problem with the Office's characterization of Kleinschmidt as disclosing a gas cell inside the cavity. Item 104, again, is the purge chamber that holds oxygen during calibration of the laser and an inert gas during laser operation.

No claim requires amendment to overcome the rejections based upon Kleinschmidt. However, the respective bodies of independent claims 1 and 2 have been improved by making the operation of the laser a positive step of the method, as distinguished from a function thereof.

Conclusion

Applicant agrees that the art made of record and not relied upon is not more pertinent to the claimed invention than the art cited.

A Notice of Allowance is solicited. If the Office is not fully persuaded as to the merits of Applicant's position, or if an Examiner's Amendment would place the pending claims in condition for allowance, a telephone call to the undersigned at (727) 507-8558 is requested. Applicant thanks the Office for its careful examination of this important patent application.

Very respectfully,

SMITH & HOPEN

By: _____

Dated: February 6, 2006

Ronald E. Smith
Suite 220
15950 Bay Vista Drive
Clearwater, FL 33760
(727) 507-8558
Reg. No. 28,761
Attorneys for Applicant

pc: University of South Florida

CERTIFICATE OF FACSIMILE TRANSMISSION
(37 C.F.R. 1.8)

I HEREBY CERTIFY that this Amendment A, including Introductory Comments, Amendments to the Claims, Amendments to the Drawings and Remarks, is being transmitted by facsimile to the United States Patent and Trademark Office, Central Fax, Attn: Mr. James A. Menefee, (571) 273-8300 on February 6, 2006.

Dated: February 6, 2006

April Turley